conjunction with alum coagulation and sedimentation or slow sand filtration; in fact, it may be used either alone or as an accessory to other methods. Following is a partial list of cities now using hypochlorite of lime in their drinking water supplies: New York, 16 pounds per million gallons; Omaha, 7½ pounds per million gallons after coagulation and sedimentation; Cincinnati, 5 to 12½ pounds—typhoid rate reduced to 5.7; St. Louis; Minneapolis, after mechanical filtration; Toronto, 6 pounds; Montreal, 5 to 7½ pounds; Cleveland, 16 pounds; Erie, 7 to 10 pounds; Chicago; Milwaukee, 6 pounds; Pittsburgh, 3 pounds, after slow sand filtration; Jersey City, 5 to 8 pounds; Council Bluffs, 15 pounds, following alum precipitation; Brainerd, Minn.; Ridgeway, N. J.; Corning, N. Y.; Nashville, Tenn., 14 pounds; Grand Rapids, Mich.; Little Falls, N. J.; Harrisburg, Pa.; Baltimore, Md.; Niagara Falls; Toronto; Ottumwa, Iowa, and others. It is important to remember that in waters treated with chlorinated lime, free chlorine never is present. While the chlorinated lime kills bacteria in the amounts used, it does not purify organic matter, cure discoloration, turbidity, or neutralize tastes and odors in the water. The remarkable germicidal power of chlorinated lime is better understood when it is known that three grains of a practically harmless substance will kill myriads of bacteria contained in a barrel of water. Ordinarily the amounts used are from one to two or five parts per million parts of water. Much more is required in sewage. A bacterial reduction of 99 per cent. may be obtained in a water containing little organic matter, with one part per million, whereas it requires 1 part to 25,000 parts of sewage to affect a similar bacterial reduction. In practice, the average amount of bleach used in water purification is from 5 to 12 pounds per million gallons of water. The bleach cannot be detected by the sense of taste, provided the amount does not exceed 25 pounds. While the chlorinated lime treatment of water supplies is essentially simple, yet it requires able professional supervision else disappointing results will come from haphazard work. The great essential is a uniform dosing of a standard solution. Bleaching powder is also used in the disinfection of the water of swimming pools, for street sprinkling, and flushing, for the disinfection of feces and sputum; and to a certain extent, for the disinfection of glassware, fabrics, brushes, and combs. It is one of the best substances we have for the general disinfection of rough places, such as slaughter-houses, bakehouses, dairies, outhouses, cellars, and the like. In surgery chlorinated soda is used, the action of which is entirely analogous to chlorinated lime.

The Stable Fly as a Carrier of Disease.—SCHUBERG and KUHN (*Arbeiten a. d. Kaiserl. Ges.-Amt.*, 1912, xl, No. 2) have studied the question of the transmission of various infections, particularly relapsing fever, anthrax, Southwest African horse sickness (Pferdesterbe), and epithelioma of fowls (Hühnerpocken) through the agency of the stable fly (*Stomoxys calcitrans*). The first report of these studies was published a year ago (*Arbeiten a. d. Kaiserl. Ges.-Amt.*, 1911, xxxi, No. 2) with special reference to trypanosomes and spirochetes. The successful results obtained by Schuberg and Kuhn now have an added significance in view of the recent findings which incriminate the stable fly as a transmitter of the virus of poliomyelitis (Rosenau, Brues, Richardson, *et. al.*, confirmed by Anderson and Frost). Schuberg and Kuhn successfully transferred the Spirochæta obermeieri from infected rats to healthy rats through the bites of Stomoxys calcitrans. Practically every one of the flies were able to transfer the infection provided only five minutes intervene between the bites of the infected and the healthy animal. If ten minutes intervene some of the flies are no longer infective, and if fifteen minutes intervene the number of infective flies is markedly diminished. It developed, as a result of ten experiments, that infection did not occur after an interval of thirty minutes. Nattan-Larrier, in 1911, showed that the spirochetæ of relapsing fever may live in the intestinal tract of the ordinary house fly that has fed upon infectious material, and pointed out the possibility of thus transferring the infection. Prior to Nattan-Larrier's work Sergent and Foley showed that house flies (Musca domestica) which fed upon the blood coming from the nose of the patient, contained numerous spirochetes which remained intact to microscopic examination at least twenty-four hours. Experiments designed to transfer the infection from man to apes by means of the common house fly were negative. (Other insects, such as body lice, have been incriminated as carriers of the infection of relapsing fever.) Copeman, Howlett, and Merriman, in 1911, showed by coloring flies that they may fly 1700 yards from the place where they are born. It was also shown that a fly may travel about one-fourth of a mile in half an hour. It is therefore evident that a fly such as Stomoxys calcitrans, which is strong upon the wing, may convey the infection of relapsing fever for a distance of about 750 feet during the fifteen minutes it remains infective. The experimental investigations upon Southwest African horse sickness (Pferdesterbe) were likewise successful in that this infection was transmitted through the bites of the stable fly. Schuberg and Kuhn are careful to note that stall infection is possible, and are in some doubt as to how much of a role the Stomoxys plays in nature. These same authors made three experiments by interrupting the bites of Stomoxys in epithelioma of fowls (Hühnerpocken). All three experiments were positive. Schuberg and Kuhn express the opinion that, in view of the great resistance of this virus, especially against drying, and further, in view of the small amount necessary to reproduce the disease, it is not unlikely that Stomoxys may remain infective a long period of time, and it therefore seems that this may be of practical importance in the transmission of the disease in nature. The Stomoxys breeds in manure, and it would, therefore, have ready access to chickens, which they are known to bite under natural conditions. Finally, Schuberg and Kuhn succeeded in transferring anthrax to mice and guinea-pigs through the bites of Stomoxys calcitrans. These experiments consisted in permitting the flies to feed upon the livers and spleens of infected animals, and the longest interval between such feeding and the bites of the susceptible animal was two hours and ten minutes. In one case successful infection was obtained by the bite of one single fly at an interval of ten minutes. Six experiments were then undertaken to transfer the infection from animal to animal with one positive result. The donor was a mouse having large numbers of anthrax bacilli in its blood at the time of the bite; the recipient was a guinea-pig which was bitten ten minutes later. It is known that anthrax bacilli appear in the circulating blood suddenly, and in nature flies may obtain the infection in this way or from shed blood. The latter perhaps would be more dangerous on account of spore formation. It is evident that Stomoxys cannot play the major role in the transfer of anthrax in nature, but doubtless is responsible for occasional cases, especially anthrax of the skin. Man, as well as animals, may thus receive the infection.

The Role of the Stable Fly in the Transmission of Surra.—Mitzmain, M. B. (*Philippine Journal of Science*, December, 1912, vii, 6 p. 475) reports the results of a long series of carefully conducted experiments to determine the role of Stomoxys calcitrans in the transmission of Trypanosoma evansi. Negative results were obtained in attempts at direct mechanical transmission of surra with flies, which were induced to bite healthy animals at intervals ranging from five minutes to three days, after being permitted to complete the feeding upon infected animals. Thousands of Stomoxys calcitrans were employed in twenty-nine experiments, involving the use of three horses six monkeys, and twenty-two guinea-pigs. Attempts also proved negative to transmit surra by the interrupted method of feeding. In these experiments the intervals between feeding on infected and healthy animals averaged twenty-five to forty seconds. The only positive result obtained was produced from a succession of 206 interrupted bites, in which the flies were transferred immediately from the infected to the "clean" animal. The flies were applied thirty-two hours during a period of six days. Mitzmain concludes that these experiments indicate that Trypanosoma evansi does not develop in the body of Stomoxys calcitrans. He was unable to find the organisms of surra in the flies beyond eighteen hours after feeding on an infected animal, and the limit for infection by inoculation was six hours. Pathogenic trypanosomes were found in the proboscis of the fly thirty seconds after feeding on infected blood. However, after one minute and thirty seconds the organisms were not present in the mouth parts in a form capable of infecting by inoculation into guinea-pigs. Mitzmain also found as a result of these experiments, that the wounds made by Stomoxys calcitrans are not suitable channels for infection. No evidence was obtained to indicate that Trypanosoma evansi is hereditarily transmitted to the offspring of Stomoxys calcitrans. The larva of this fly fed on surra blood does not continue to harbor the trypanosoma, and the fly is "clean" upon reaching maturity. Mitzmain believes the the individual glass-tube method is the most suitable for applying flies in feeding on experimental animals, and for keeping flies for long periods under laboratory condtions.

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